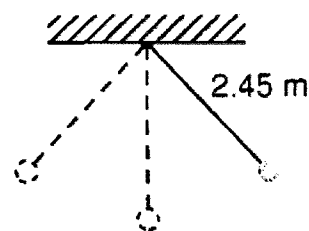


## Sinusoidal Problems and SHM Problems

✓1) The length of a simple pendulum is 2.45 m. What is the period and what is the frequency if  $g$  is  $9.81 \text{ m} \cdot \text{s}^{-2}$ ?



✓2)

Chuck found that a simple pendulum of length 0.90 meter had a period of  $T$  seconds. What should be the length for the period to be  $0.85T$  seconds?

3)

The equation of a vibrating object is  $x = 10 \cos 2\pi(0.25)t$  meters. (a) What is the amplitude of vibration? (b) What is the frequency? (c) What is the period?

4)

The mass of a frictionless mass-spring system is displaced 32 centimeters from its equilibrium position and released. The period of the oscillation is 1.45 seconds. Write the equation of the sinusoid that describes the position of the mass as a function of time.

✓5)

A simple pendulum has a length of  $L$  and a period of 3.00 seconds. What is the period when the length is increased to  $1.86L$ ?

6)

The equation of a vibrating object is  $x = 2 \cos \frac{3\pi}{4}t$  meters. (a) What is the amplitude of vibration? (b) What is the frequency? (c) What is the period?

7)

A wave has an amplitude of 2.5 m and a frequency of 2.1 hertz. (a) Write the equation that describes the motion of the wave. (b) If the wave has a wavelength of 2.0 m, determine the speed of the wave.

✓8)

The length of a simple pendulum is 6.10 meters, the local attraction of gravity is 9.81 newtons per kilogram, and the mass of the pendulum bob is 11.0 kg. What is the period and what is the frequency?

## Sinusoidal Problems and SHM Problems

The pendulum on a grandfather clock functions as a simple pendulum. The mass of the pendulum is 4.25 kg, and the local attraction of gravity is 9.81 newtons per kilogram. What must be the length of the pendulum in order for the pendulum to have a period of 1.00 second?

✓ 9)

✓ 10)

A perfect spring whose spring constant is 1250 newtons per meter is attached to a 32-kg object, as shown. The object is displaced 3.35 meters from its rest position and released. The object slides on a frictionless surface. What will be its speed when it passes its rest position?

